We claim:

1. Isolated DNA sequence coding for a tumor rejection antigen.

2. Isolated DNA sequence of claim 1, coding for a tumor rejection antigen specific for mastocytoma.

3. Isolated DNA sequence of claim 1, coding for tumor rejection antigen P815.

4. Isolated DNA sequence of claim 1, comprising three exons having the nucleotide sequence of figure 6 and sequence of id no: 1.

5. Isolated DNA sequence of claim 1, coding for a human tumor rejection antigen.

6. Isolated DNA sequence of claim 5, wherein said tumor rejection antigen is characteristic of melanoma.

7. Isolated DNA sequence of claim 6, wherein said tumor rejection antigen is melanoma antigen E, and has nucleic acid sequence:

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      |  10      |  20      |  30      |  40      |  50      |  60
    1 GGATCCAGGC CCTGCCAGGA AAAATATAAG GGCCCTGCGT GAGAACAGAG GGGGTCATCC 60
   61 ACTGCATGAG AGTGGGGATG TCACAGAGTC CAGCCCACCC TCCTGGTAGC ACTGAGAAGC 120
  121 CAGGGCTGTG CTTGCGGTCT GCACCCTGAG GGCCCGTGGA TTCCTCTTCC TGGAGCTCCA 180
  181 GGAACCAGGC AGTGAGGCCT TGGTCTGAGA CAGTATCCTC AGGTCACAGA GCAGAGGATG 240
  241 CACAGGGTGT GCCAGCAGTG AATGTTTGCC CTGAATGCAC ACCAAGGGCC CCACCTGCCA 300
  301 CAGGACACAT AGGACTCCAC AGAGTCTGGC CTCACCTCCC TACTGTCAGT CCTGTAGAAT 360
  361 CGACCTCTGC TGGCCGGCTG TACCCTGAGT ACCCTCTCAC TTCCTCCTTC AGGTTTTCAG 420
  421 GGGACAGGCC AACCCAGAGG ACAGGATTCC CTGGAGGCCA CAGAGGAGCA CCAAGGAGAA 480
  481 GATCTGTAAG TAGGCCTTTG TTAGAGTCTC CAAGGTTCAG TTCTCAGCTG AGGCCTCTCA 540
  541 CACACTCCCT CTCTCCCCAG GCCTGTGGGT CTTCATTGCC CAGCTCCTGC CCACACTCCT 600
  601 GCCTGCTGCC CTGACGAGAG TCATCATGTC TCTTGAGCAG AGGAGTCTGC ACTGCAAGCC 660
  661 TGAGGAAGCC CTTGAGGCCC AACAAGAGGC CCTGGGCTGG TGTGTGTGCA GGCTGCCACC 720
  721 TCCTCCTCCT CTCCTCTGGT CCTGGGCACC CTGGAGGAGG TGCCCACTGC TGGGTCAACA 780
  781 GATCCTCCCC AGAGTCCTCA GGGAGCCTCC GCCTTTCCCA CTACCATCAA CTTCACTCGA 840
  841 CAGAGGCAAC CCAGTGAGGG TTCCAGCAGC CGTGAAGAGG AGGGGCCAAG CACCTCTTGT 900
  901 ATCCTGGAGT CCTTGTTCCG AGCAGTAATC ACTAAGAAGG TGGCTGATTT GGTTGGTTTT 960
  961 CTGCTCCTCA AATATCGAGC CAGGGAGCCA GTCACAAAGG CAGAAATGCT GGAGAGTGTC 1020
 1021 ATCAAAAATT ACAAGCACTG TTTTCCTGAG ATCTTCGGCA AAGCCTCTGA GTCCTTGCAG 1080
 1081 CTGGTCTTTG GCATTGACGT GAAGGAAGCA GACCCCACCG GCCACTCCTA TGTCCTTGTC 1140
 1141 ACCTGCCTAG GTCTCTCCTA TGATGGCCTG CTGGGTGATA ATCAGATCAT GCCCAAGACA 1200
 1201 GGCTTCCTGA TAATTGTCCT GGTCATGATT GCAATGGAGG GCGGCCATGC TCCTGAGGAG 1260
 1261 GAAATCTGGG AGGAGCTGAG TGTGATGGAG GTGTATGATG GGAGGGAGCA CAGTGCCTAT 1320
 1321 GGGGAGCCCA GGAAGCTGCT CACCCAAGAT TTGGTGCAGG AAAAGTACCT GGAGTACGGC 1380
 1381 AGGTGCCGGA CAGTGATCCC GCACGCTATG AGTTCCTGTG GGGTCCAAGG GCCCTCGCTG 1440
 1441 AAACCAGCTA TGTGAAAGTC CTTGAGTATG TGATCAAGGT CAGTGCAAGA GTTCGCTTTT 1500
 1501 TCTTCCCATC CCTGCGTGAA GCAGCTTTGA GAGAGGAGGA AGAGGGAGTC TGAGCATGAG 1560
 1561 TTGCAGCCAA GGCCAGTGGG AGGGGGACTG GGCCAGTGCA CCTTCCAGGG CCGCGTCCAG 1620
 1621 CAGCTTCCCC TGCCTCGTGT GACATGAGGC CCATTCTTCA CTCTGAAGAG AGCGGTCAGT 1680
 1681 GTTCTCAGTA GTAGGTTTCT GTTCTATTGG GTGACTTGGA GATTTATCTT TGTTCTCTTT 1740
 1741 TGGAATTGTT CAAATGTTTT TTTTTAAGGG ATGGTTGAAT GAACTTCAGC ATCCAAGTTT 1800
 1801 ATGAATGACA GCAGTCACAC AGTTCTGTGT ATATAGTTTA AGGGTAAGAG TCTTGTGTTT 1860
 1861 TATTCAGATT GGGAAATCCA TTCTATTTTG TGAATTGGGA TAATAACAGC AGTGGAATAA 1920
 1921 GTACTTAGAA ATGTGAAAAA TGAGCAGTAA AATAGATGAG ATAAAGAACT AAAGAAATTA 1980
 1981 AGAGATAGTC AATTCTTGCC TTATACCTCA GTCTATTCTG TAAAATTTTT AAAGATATAT 2040
 2041 GCATACCTGG ATTTCCTTGG CTTCTTTGAG AATGTAAGAG AAATTAAATC TGAATAAAGA 2100
 2101 ATTCTTCCTG TTCACTGGCT CTTTTCTTCT CCATGCACTG AGCATCTGCT TTTTGGAAGG 2160
 2161 CCCTGGGTTA GTAGTGGAGA TGCTAAGGTA AGCCAGACTC ATACCCACCC ATAGGGTCGT 2220
 2221 AGAGTCTAGG AGCTGCAGTC ACGTAATCGA GGTGGCAAGA TGTCCTCTAA AGATGTAGGG 2280
 2281 AAAAGTGAGA GAGGGGTGAG GGTGTGGGGC TCCGGGTGAG AGTGGTGGAG TGTCAATGCC 2340
 2341 CTGAGCTGGG GCATTTTGGG CTTTGGGAAA CTGCAGTTCC TTCTGGGGGA GCTGATTGTA 2400
 2401 ATGATCTTGG GTGGATCC                                              2418
      |  10      |  20      |  30      |  40      |  50      |  60
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8. Biologically pure culture of a cell line transfected with the isolated DNA sequence of claim 1.

9. Biologically pure culture of claim 5, wherein said cell line is selected from the group consisting of P1A.T2 and P1A.TC3.1.

10. Biologically pure culture of a highly transfectable cell line derived from a parent cell line which expresses at least one P815 tumor antigen, wherein said highly transfectable cell line does not express any of P815 tumor antigens A, B and C.

11. Biologically pure cell line of claim 7, comprising cell line PO.HTR.

12. Biologically pure cell line of claim 7, wherein said isolated DNA sequence is a human tumor rejection antigen.

13. Biologically pure cell line of claim 12, wherein said tumor rejection antigen is characteristic of melanoma.

14. Biologically pure cell line of claim 13, said tumor rejection antigen is melanoma antigen E and isolated DNA has nucleic acid sequence:

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      |  10      |  20      |  30      |  40      |  50      |  60
    1 GGATCCAGGC CCTGCCAGGA AAAATATAAG GGCCCTGCGT GAGAACAGAG GGGGTCATCC 60
   61 ACTGCATGAG AGTGGGGATG TCACAGAGTC CAGCCCACCC TCCTGGTAGC ACTGAGAAGC 120
  121 CAGGGCTGTG CTTGCGGTCT GCACCCTGAG GGCCCGTGGA TTCCTCTTCC TGGAGCTCCA 180
  181 GGAACCAGGC AGTGAGGCCT TGGTCTGAGA CAGTATCCTC AGGTCACAGA GCAGAGGATG 240
  241 CACAGGGTGT GCCAGCAGTG AATGTTTGCC CTGAATGCAC ACCAAGGGCC CCACCTGCCA 300
  301 CAGGACACAT AGGACTCCAC AGAGTCTGGC CTCACCTCCC TACTGTCAGT CCTGTAGAAT 360
  361 CGACCTCTGC TGGCCGGCTG TACCCTGAGT ACCCTCTCAC TTCCTCCTTC AGGTTTTCAG 420
  421 GGGACAGGCC AACCCAGAGG ACAGGATTCC CTGGAGGCCA CAGAGGAGCA CCAAGGAGAA 480
  481 GATCTGTAAG TAGGCCTTTG TTAGAGTCTC CAAGGTTCAG TTCTCAGCTG AGGCCTCTCA 540
  541 CACACTCCCT CTCTCCCCAG GCCTGTGGGT CTTCATTGCC CAGCTCCTGC CCACACTCCT 600
  601 GCCTGCTGCC CTGACGAGAG TCATCATGTC TCTTGAGCAG AGGAGTCTGC ACTGCAAGCC 660
  661 TGAGGAAGCC CTTGAGGCCC AACAAGAGGC CCTGGGCTGG TGTGTGTGCA GGCTGCCACC 720
  721 TCCTCCTCCT CTCCTCTGGT CCTGGGCACC CTGGAGGAGG TGCCCACTGC TGGGTCAACA 780
  781 GATCCTCCCC AGAGTCCTCA GGGAGCCTCC GCCTTTCCCA CTACCATCAA CTTCACTCGA 840
  841 CAGAGGCAAC CCAGTGAGGG TTCCAGCAGC CGTGAAGAGG AGGGGCCAAG CACCTCTTGT 900
  901 ATCCTGGAGT CCTTGTTCCG AGCAGTAATC ACTAAGAAGG TGGCTGATTT GGTTGGTTTT 960
  961 CTGCTCCTCA AATATCGAGC CAGGGAGCCA GTCACAAAGG CAGAAATGCT GGAGAGTGTC 1020
 1021 ATCAAAAATT ACAAGCACTG TTTTCCTGAG ATCTTCGGCA AAGCCTCTGA GTCCTTGCAG 1080
 1081 CTGGTCTTTG GCATTGACGT GAAGGAAGCA GACCCCACCG GCCACTCCTA TGTCCTTGTC 1140
 1141 ACCTGCCTAG GTCTCTCCTA TGATGGCCTG CTGGGTGATA ATCAGATCAT GCCCAAGACA 1200
 1201 GGCTTCCTGA TAATTGTCCT GGTCATGATT GCAATGGAGG GCGGCCATGC TCCTGAGGAG 1260
 1261 GAAATCTGGG AGGAGCTGAG TGTGATGGAG GTGTATGATG GGAGGGAGCA CAGTGCCTAT 1320
 1321 GGGGAGCCCA GGAAGCTGCT CACCCAAGAT TTGGTGCAGG AAAAGTACCT GGAGTACGGC 1380
 1381 AGGTGCCGGA CAGTGATCCC GCACGCTATG AGTTCCTGTG GGGTCCAAGG GCCCTCGCTG 1440
 1441 AAACCAGCTA TGTGAAAGTC CTTGAGTATG TGATCAAGGT CAGTGCAAGA GTTCGCTTTT 1500
 1501 TCTTCCCATC CCTGCGTGAA GCAGCTTTGA GAGAGGAGGA AGAGGGAGTC TGAGCATGAG 1560
 1561 TTGCAGCCAA GGCCAGTGGG AGGGGGACTG GGCCAGTGCA CCTTCCAGGG CCGCGTCCAG 1620
 1621 CAGCTTCCCC TGCCTCGTGT GACATGAGGC CCATTCTTCA CTCTGAAGAG AGCGGTCAGT 1680
 1681 GTTCTCAGTA GTAGGTTTCT GTTCTATTGG GTGACTTGGA GATTTATCTT TGTTCTCTTT 1740
 1741 TGGAATTGTT CAAATGTTTT TTTTTAAGGG ATGGTTGAAT GAACTTCAGC ATCCAAGTTT 1800
 1801 ATGAATGACA GCAGTCACAC AGTTCTGTGT ATATAGTTTA AGGGTAAGAG TCTTGTGTTT 1860
 1861 TATTCAGATT GGGAAATCCA TTCTATTTTG TGAATTGGGA TAATAACAGC AGTGGAATAA 1920
 1921 GTACTTAGAA ATGTGAAAAA TGAGCAGTAA AATAGATGAG ATAAAGAACT AAAGAAATTA 1980
 1981 AGAGATAGTC AATTCTTGCC TTATACCTCA GTCTATTCTG TAAAATTTTT AAAGATATAT 2040
 2041 GCATACCTGG ATTTCCTTGG CTTCTTTGAG AATGTAAGAG AAATTAAATC TGAATAAAGA 2100
 2101 ATTCTTCCTG TTCACTGGCT CTTTTCTTCT CCATGCACTG AGCATCTGCT TTTTGGAAGG 2160
 2161 CCCTGGGTTA GTAGTGGAGA TGCTAAGGTA AGCCAGACTC ATACCCACCC ATAGGGTCGT 2220
 2221 AGAGTCTAGG AGCTGCAGTC ACGTAATCGA GGTGGCAAGA TGTCCTCTAA AGATGTAGGG 2280
 2281 AAAAGTGAGA GAGGGGTGAG GGTGTGGGGC TCCGGGTGAG AGTGGTGGAG TGTCAATGCC 2340
 2341 CTGAGCTGGG GCATTTTGGG CTTTGGGAAA CTGCAGTTCC TTCTGGGGGA GCTGATTGTA 2400
 2401 ATGATCTTGG GTGGATCC                                             2418
      |  10      |  20      |  30      |  40      |  50      |  60
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15. Method for diagnosing presence of a tumor in a patient, comprising contacting a lymphocyte containing sample of said patient to a cell line transfected with a DNA sequence coding for a tumor rejection antigen specific for the tumor to be diagnosed, and determining lysis of said transfected cell line by a cytotoxic T cell line said lymphocyte containing sample as an indication of said tumor.

16. Method for treating a patient with a tumor, comprising:

(i) removing a lymphocyte containing sample from said patient,

(ii) contacting the lymphocyte containing sample to a cell line transfected with a gene coding for and expressing a gene for a tumor rejection antigen specific for the tumor of said patient, under conditions favoring production of cytotoxic T cells against said tumor rejection antigen, and

(iii) introducing said cytotoxic T cells to said patient in an amount sufficient to lyse cells of said tumor.

17. Isolated tumor rejection antigen.

18. Vaccine useful in treating a patient with a tumor comprising a pure peptide or peptide fragment characteristic of the tumor to be treated which binds with an MHC-I or HLA molecule and stimulates production of cytotoxic T cells specific for cells of said tumor.

19. Isolated tumor rejection antigen of claim 10, having the amino acid sequence of figure 7 and sequence id no: 1.

20. Vaccine of claim 18, wherein said pure peptide has the amino acid sequence of figure 7 and sequence id no: 1.

21. Vaccine of claim 20, wherein said tumor is a melanoma.

22. Vaccine of claim 21, wherein said pure peptide or peptide fragment is coded for by nucleic acid sequence:

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        |   10      |   20      |   30      |   40      |   50      |   60
   1 GGATCCAGGC CCTGCCAGGA AAAATATAAG GGCCCTGCGT GAGAACAGAG GGGGTCATCC 60
  61 ACTGCATGAG AGTGGGGATG TCACAGAGTC CAGCCCACCC TCCTGGTAGC ACTGAGAAGC 120
 121 CAGGGCTGTG CTTGCGGTCT GCACCCTGAG GGCCCGTGGA TTCCTCTTCC TGGAGCTCCA 180
 181 GGAACCAGGC AGTGAGGCCT TGGTCTGAGA CAGTATCCTC AGGTCACAGA GCAGAGGATG 240
 241 CACAGGGTGT GCCAGCAGTG AATGTTTGCC CTGAATGCAC ACCAAGGGCC CCACCTGCCA 300
 301 CAGGACACAT AGGACTCCAC AGAGTCTGGC CTCACCTCCC TACTGTCAGT CCTGTAGAAT 360
 361 CGACCTCTGC TGGCCGGCTG TACCCTGAGT ACCCTCTCAC TTCCTCCTTC AGGTTTTCAG 420
 421 GGGACAGGCC AACCCAGAGG ACAGGATTCC CTGGAGGCCA CAGAGGAGCA CCAAGGAGAA 480
 481 GATCTGTAAG TAGGCCTTTG TTAGAGTCTC CAAGGTTCAG TTCTCAGCTG AGGCCTCTCA 540
 541 CACACTCCCT CTCTCCCCAG GCCTGTGGGT CTTCATTGCC CAGCTCCTGC CCACACTCCT 600
 601 GCCTGCTGCC CTGACGAGAG TCATCATGTC TCTTGAGCAG AGGAGTCTGC ACTGCAAGCC 660
 661 TGAGGAAGCC CTTGAGGCCC AACAAGAGGC CCTGGGCTGG TGTGTGTGCA GGCTGCCACC 720
 721 TCCTCCTCCT CTCCTCTGGT CCTGGGCACC CTGGAGGAGG TGCCCACTGC TGGGTCAACA 780
 781 GATCCTCCCC AGAGTCCTCA GGGAGCCTCC GCCTTTCCCA CTACCATCAA CTTCACTCGA 840
 841 CAGAGGCAAC CCAGTGAGGG TTCCAGCAGC CGTGAAGAGG AGGGGCCAAG CACCTCTTGT 900
 901 ATCCTGGAGT CCTTGTTCCG AGCAGTAATC ACTAAGAAGG TGGCTGATTT GGTTGGTTTT 960
 961 CTGCTCCTCA AATATCGAGC CAGGGAGCCA GTCACAAAGG CAGAAATGCT GGAGAGTGTC 1020
1021 ATCAAAAATT ACAAGCACTG TTTTCCTGAG ATCTTCGGCA AAGCCTCTGA GTCCTTGCAG 1080
1081 CTGGTCTTTG GCATTGACGT GAAGGAAGCA GACCCCACCG GCCACTCCTA TGTCCTTGTC 1140
1141 ACCTGCCTAG GTCTCTCCTA TGATGGCCTG CTGGGTGATA ATCAGATCAT GCCCAAGACA 1200
1201 GGCTTCCTGA TAATTGTCCT GGTCATGATT GCAATGGAGG GCGGCCATGC TCCTGAGGAG 1260
1261 GAAATCTGGG AGGAGCTGAG TGTGATGGAG GTGTATGATG GGAGGGAGCA CAGTGCCTAT 1320
1321 GGGGAGCCCA GGAAGCTGCT CACCCAAGAT TTGGTGCAGG AAAAGTACCT GGAGTACGGC 1380
1381 AGGTGCCGGA CAGTGATCCC GCACGCTATG AGTTCCTGTG GGGTCCAAGG GCCCTCGCTG 1440
1441 AAACCAGCTA TGTGAAAGTC CTTGAGTATG TGATCAAGGT CAGTGCAAGA GTTCGCTTTT 1500
1501 TCTTCCCATC CCTGCGTGAA GCAGCTTTGA GAGAGGAGGA AGAGGGAGTC TGAGCATGAG 1560
1561 TTGCAGCCAA GGCCAGTGGG AGGGGGACTG GGCCAGTGCA CCTTCCAGGG CCGCGTCCAG 1620
1621 CAGCTTCCCC TGCCTCGTGT GACATGAGGC CCATTCTTCA CTCTGAAGAG AGCGGTCAGT 1680
1681 GTTCTCAGTA GTAGGTTTCT GTTCTATTGG GTGACTTGGA GATTTATCTT TGTTCTCTTT 1740
1741 TGGAATTGTT CAAATGTTTT TTTTTAAGGG ATGGTTGAAT GAACTTCAGC ATCCAAGTTT 1800
1801 ATGAATGACA GCAGTCACAC AGTTCTGTGT ATATAGTTTA AGGGTAAGAG TCTTGTGTTT 1860
1861 TATTCAGATT GGGAAATCCA TTCTATTTTG TGAATTGGGA TAATAACAGC AGTGGAATAA 1920
1921 GTACTTAGAA ATGTGAAAAA TGAGCAGTAA AATAGATGAG ATAAAGAACT AAAGAAATTA 1980
1981 AGAGATAGTC AATTCTTGCC TTATACCTCA GTCTATTCTG TAAAATTTTT AAAGATATAT 2040
2041 GCATACCTGG ATTTCCTTGG CTTCTTTGAG AATGTAAGAG AAATTAAATC TGAATAAAGA 2100
2101 ATTCTTCCTG TTCACTGGCT CTTTTCTTCT CCATGCACTG AGCATCTGCT TTTTGGAAGG 2160
2161 CCCTGGGTTA GTAGTGGAGA TGCTAAGGTA AGCCAGACTC ATACCCACCC ATAGGGTCGT 2220
2221 AGAGTCTAGG AGCTGCAGTC ACGTAATCGA GGTGGCAAGA TGTCCTCTAA AGATGTAGGG 2280
2281 AAAAGTGAGA GAGGGGTGAG GGTGTGGGGC TCCGGGTGAG AGTGGTGGAG TGTCAATGCC 2340
2341 CTGAGCTGGG GCATTTTGGG CTTTGGGAAA CTGCAGTTCC TTCTGGGGGA GCTGATTGTA 2400
2401 ATGATCTTGG GTGGATCC                                             2418
        |   10      |   20      |   30      |   40      |   50      |   60
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23. Method for treating a patient with a tumor, comprising:

(i) identifying a tumor rejection antigen expressed by the tumor;

(ii) identifying a cell line which expresses an immunologically identical tumor rejection antigen;

(iii) treating a sample of said cell line to render it non-replicable, and

(iv) administering an amount of said non-replicable cell line to said patient sufficient to generate a cytolytic T cell response which lyses cells of said tumor.

24. Method of claim 23, wherein said tumor is a melanoma.

25. Vaccine useful in treating a patient with a tumor comprising an amount of a non-replicable cell line which expresses a tumor rejection antigen immunologically identical to a tumor rejection antigen expressed by said tumor sufficient to provoke a cytotoxic T cell response leading to lysis of cells of said tumor.

26. Method for identifying a cytotoxic T cell useful in treating a patient with a tumor, comprising:

(i) identifying a tumor rejection antigen expressed by said tumor,

(ii) contacting a cell expressing said antigen to a cytotoxic T cell, and

(iii) measuring tumor necrosis factor (TF) released by said cytotoxic T cell, wherein release of TNF is indicative of a cytotoxic T cell against said tumor.